[0013] Preferably, the step of classifying comprises using a one-class classifier. The one-class classifier may use a parametric D^2 test, as described in the book "Multivariate Statistical Methods" (third edition), by Morrison, McGraw-Hill Publishing Company, New York (1990). Another one-class classifier that could be used is a semi-parametric test based on a mixture of Guassians. This semi-parametric test may employ a bootstrap.

[0014] Preferably, the method further involves optimizing the step of segmenting, for example optimizing the number of segments. This may be done using a stochastic algorithm such as a genetic algorithm. The step of optimizing may involve determining a preferred combination of segments that could be used in a validation process, which preferred combination is best for providing an indication of validity.

[0015] The method in which the first aspect of the invention is embodied is preferably implemented using software. To this end, according to another aspect of the invention, there is provided a computer program, preferably on a data carrier or computer readable medium, having code or instructions for using images of a plurality of reference documents, such as banknotes, which images are captured using a scanner or imager, and processing the plurality of images to determine a reference template.

[0016] Preferably, the computer program has code or instructions for segmenting each image in a like manner into a plurality of segments, and comparing like segments of the plurality of images to determine a reference segment image or reference segment parameter for each segment.

[0017] The code or instructions for comparing the segments of the images may be operable to classify each segment to determine a reference classification parameter for each segment, and preferably a threshold for the reference classification parameter. The code or instruction for classifying may implement a one-class classifier, for example a one-class classifier that uses a parametric D^2 test or a semi-parametric test based on a mixture of Guassians, preferably employing a bootstrap.

[0018] The computer program may comprise code or instructions for optimizing the step of segmenting, preferably by determining a preferred number of segments and/or a preferred combination of segments for use in a validation process. The code or instructions for optimizing the step of segmenting may use a stochastic algorithm.

[0019] According to yet another aspect of the present invention, there is provided a system for developing a template for a document that has to be validated, the system comprising means for using images of a plurality of genuine documents such as banknotes; means for segmenting each image in a like manner into a plurality of segments; means for classifying the segments of the images to determine a reference classification parameter for each segment; and means for defining a threshold for the reference classification parameter.

[0020] Once the template is dynamically defined using any of the techniques in which the preceding aspects of the invention are embodied, it can be used in a subsequent validation process. To this end, according to still another aspect of the invention, there is provided a method for verifying or validating documents comprising capturing an image of the document; segmenting that captured image into a plurality of different segments; comparing one or more of the segments of the captured image with corresponding segments of a reference image, and determining whether the document is valid or invalid based on the results of the step of comparing.

[0021] By comparing one or more of the segments of the captured image with the corresponding segments of the reference image, it is meant comparing the image segments or any data associated with or indicative of those image segments. In particular, the step of comparing the segments of the image with the corresponding segments of the reference image may involve classifying each segment to determine a classification parameter, and comparing that classification parameter with a threshold reference classification parameter for the corresponding segment of the reference image. The step of classifying may use a one-class classifier. The one-class classifier may use a parametric D^2 test, or a semi-parametric test based on a mixture of Guassians. The semi-parametric test may employ a bootstrap.

[0022] The method may involve comparing a plurality of the captured image segments with a corresponding plurality of the reference segments, thereby to determine the validity of each of these segments. To determine the overall validity of the document, the validity of a plurality of the segments may be combined. This may be done using a unanimous vote, in which all of the segments considered have to be valid in order to give an overall result that the document is valid. Alternatively, a majority vote be used, in which only a majority of the segments considered have to be valid in order to give an overall result that the document is valid.

[0023] In order to combine the results of the validation of each segment, a figure of merit may be assigned to each segment, the figure of merit being indicative of whether or not a segment is valid. The figure of merit may be an integer. As a specific example the integer 1 may be used to indicate that a segment is valid and value 0 may be allocated to segments that are invalid. To determine overall validity, the figures of merit for each of the plurality of segments may be multiplied together.

[0024] When a document is determined to be valid, the captured image or any data associated with it may be used to up-date the reference image. In this way, the reference image is continuously being improved.

[0025] According to yet another aspect of the invention, there is provided a system, preferably a self-service terminal, such as an ATM, for verifying or validating documents, the system comprising means for capturing an image of the document; means for segmenting that captured image into a plurality of different segments; means for comparing one or more of the segments of the captured image with corresponding segments of a reference image, and means for determining whether the document is valid or invalid based on the results of the step of comparing.

[0026] The system may comprise means for using the captured image or any data associated with it to up-date the reference image, if it is determined that the captured image is valid.

[0027] According to still another aspect of the invention, there is provided a method for creating a template of a document, such as a banknote, comprising capturing an image of the document, classifying the image using a